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Attached or not attached: Does different learning styles exist among students with or without sense of belonging amidst covid-19?

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Abstract

This study was about peer attachment and learning styles being moderated by a sense of belonging among students during the COVID-19 era. Using an analytical cross-sectional survey design, 284 final-year undergraduates were selected through stratified-proportionate and convenient sampling procedures. Data was gathered from the respondents using Learning Preference Scale (Owens & Straton, 1980), Adolescent Friendship Attachment Scale (Wilkinson, 2008) and Psychological Sense of School Membership (Goodenow, 1993). The data was analysed using descriptive (Frequencies and Percentages) and inferential statistics (Multivariate Multiple Regression, Simple Moderation with Hayes Process Macro and Multivariate Analysis of Variance).The study revealed that most students engaged in less peer attachment, felt less sense of belonging while secure attachment predicted the individual learning style of students. Furthermore, secure attachment and anxious attachments predicted the cooperative learning style of students while anxious attachment and avoidant attachment predicted the competitive learning style of students. Further, a sense of belonging moderated not peer attachment and learning styles of students, while no significant differences were found between male and female students in terms of peer attachment, learning styles, and sense of belonging. Therefore, it was recommended that students should practice individual learning styles most often but could collaborate with a few colleagues in some academic situations during this period of COVID-19. This is to help foster closeness and belongingness among the students.

1. Introduction

One major aspect of human lives that had a huge impact from the pandemic was the education sector. The COVID-19 pandemic forced leadership of educational institutions (early childhood to tertiary) to forgo the traditional face-to-face academic engagement and resorted to online teaching and learning so that they could help contain the situation and to prevent its onward spread among vulnerable students in school. The timely migration from face-to-face to online teaching and learning was to help complete the academic calendar

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(Browning et al., 2021). In the advent of COVID-19 pandemic, the most applicable preventive strategy is social distancing among the human race. With this, it was evident that individuals in most countries around the world are expected to minimize interaction outside the home by observing and practicing social distancing (Anderson, Heesterbeek, Klinkenberg, & Hollingsworth, 2020).

In Ghana, all educational institutions were closed to avoid the escalation of the spread. With the tertiary institutions, online teaching and learning method was used. As a contemporary platform for sharing information in most advanced countries, this online teaching and learning became a new thing and problematic in most universities in Ghana, especially the University of Cape Coast in Ghana (Henaku, 2020; Agormedah, Henaku, Ayite, & Ansah, 2020). This eminent developmental shift of academic engagement between educational instructors and their students appeared to have created new tasks among students in terms of managing their peer attachments, making efforts to employ the best learning styles and consequently developing a sense of belonging to their respective universities. Being physically present in schools with normal academic and social activities occurring, creates a high sense of belonging among the students. When students are available on normal days in school, it has a implication on how attached the students get to their peers. The availability of peers in schools leads to a high sense of peer attachment. This significantly impacts on the learning styles that the students adopt. The choice of online method of teaching and learning as a means to curb the spread of Covid 19 led to students being away from school and their peers. This greatly affected peer attachment and sense of belonging. In view of this, the authors wish to find out if the absence of on-campus teaching and learning will affect students' attachment to their peers. Again the authors wish to find out if the affected students peer attachment will predict different learning styles with a moderation role of sense of belonging.

2. Literature Review

2.1. Peer Attachment

Attachment is normally perceived as a lasting affective link with major intensity for psychological fitness (Armsden & Greenberg, 1987). Nickerson and Nagle (2005) indicated that peer attachment is a deep connection, which happens when individuals internalize the awareness that a peer will be accessible and sensitive during distress times. The attached relationship is conceptualised as a continuum of emotional regulation for managing relationships, events and affect (Jacobite & Hazen, 1999). At the one end of the scale is the anxious–avoidant attachment relationship, where over-emphasis is placed on controlling and minimising affect whereas, on the other side of the scale lies the anxious–resistant style which is regarded as the relatively uncontrolled, poorly-managed affect. Secure attachment institutes an evenness between the two extremes of emotional regulation (Charalampous, 2018).

The study of peer attachment is of particular interest in situations where social interactions are highly complicated (Laible, Carlo, & Raffaelli, 2000; Allen, Grande, Tan, & Loeb, 2018). A secure peer attachment is characterized as a relationship based on trust and beliefs that the other person understands his or her own desires and wishes and that he or she will understand and respond if communicating his or her feelings (Stern & Cassidy, 2018). Healthy peer relationships are centered on mutual understanding, trust, and good quality of communication (Theisen, Fraley, Hankin, Young & Chopik, 2018). On the contrary, the impression of alienation and separation from the peer community defines unstable peer attachment. This sentiment may be attributed to the fear of rejection of a need for closeness and affiliation, poor communication and loss of trust (Roelofs, Onckels & Muris, 2013).

It is evident that students show different patterns of behaviours in their relationships; with males emphasizing independence and females emphasizing relatedness (Gorrese, & Ruggieri, 2012). Ma and Huebner (2008) found that female students can also receive support from other female peers rather than male peers. According to Gorrese and Ruggieri (2012), male and female students had similar numbers of peer relationships, but females were more strongly connected with their peers than their male counterparts.

Likewise, it is evident that female students are more attached to their peers than their male counterparts (Henrich, Sidney, Kuperminc, Zohar, & Leadbeater, 2001; Sund & WichstrØm, 2002; Gullone & Robinson, 2005; Nelis & Rae, 2009; Richards, McGee, Williams, Welch, & Hancox 2010). Precisely, female students display higher trust in their friends and a deep communication with them (Gullone & Robinson, 2005; Song, Thompson, & Ferrer, 2009; Ruijten, Roelofs, & Rood 2011). Although gender differences on general peer attachment as well as on trust and communication are well established, differences on alienation are less consistent (Song, Thompson, & Ferrer, 2009; Ruijten, Roelofs, & Rood 2011). Precisely, some studies reported that male students were more alienated than their female counterparts (Gullone & Robinson 2005; Pace, Martini, & Zavattini, 2011) while some other studies reported no significant gender differences in peer alienation (Muris, Meesters, van Melick, & Zwambag, 2001; Nickerson & Nagle 2004; Ridenour, Greenberg, & Cook, 2006; San Martini, Zavattini, & Ronconi, 2009; Guarnieri, Ponti, & Tani, 2010; Ruijten, Roelofs, & Rood, 2011) and few studies reported that female students were more alienated than their male counterparts (Song, Thompson, & Ferrer, 2009).

As the COVID-19 pandemic surged within the educational fraternity, majority of schools globally were momentarily closed, and students were compelled to vacate schools and stay away from their friends, teachers, and classrooms where their observations of peer attachment in terms of support were compromised despite its value as psychological resource for students' educational growth and development (Sun, Lin, & Chung, 2020). Again, such lengthy separation and changes of daily routine experienced by students possibly caused mental and physiological distress among students (Banna et al., 2020; Qiu et al., 2020) as they found it problematic in satisfying their needs of belongingness. According to Van Bavel et al. (2020), the need of belongingness plays two essential functions in people in terms of maintaining emotional well-being, and maintaining stable relationships with others. Projecting the value of peer attachment, Banks and Weems (2014), alleged that peer attachment helps reduce the undesirable effects of traumatic life events on individuals' well-being in periods of pandemic as it helps the affected to fight problems emanating from the pandemic. Likewise, inadequate peer attachment appears to have a negative effect on people during pandemic situations. Undeniably, a study conducted by Banks, and Weems (2014) among African American young people exposed to natural occurrence (Hurricane Katrina) found high levels of peer attachment, and recommended that perceived high level of peer attachment from colleagues related to low negative experience (Banks & Weems, 2014). Furthermore, Elmer, Mepham, and Stadtfeld (2020) recent study among students discovered that college students exhibited lower peer attachment with their colleagues during the COVID-19 pandemic than in pre-pandemic situation, where their levels of peer attachment increased astronomically to high levels. This imply that high peer attachment could lead to an increase in sense of belonging, which will in turn lead collaborative learning among students in the long-run.

2.2. Learning Styles

Learning style has been debated by many scholars in educational psychology. It some instances, learned is presumed to be popular in the global educational landscape but it lacks empirical backing (Gudnason, 2017). This is partly caused by the lack of a single statistical measure for the construct learning style. Numerous researchers have propounded various learning style measures with varied names but with a common focus (Pashler, McDaniel, Rohrer, & Bjork, 2008; Rogowsky, Calhoun, & Tallal, 2020). Reynolds (1997) also contends that learning style is practically taken for granted despite its authenticity problems in cognitive psychology and education. In spite of these contrasting views on learning style, it is important to note that no common learning style exist for every learner because people differ in their persons and approach in executing a common academic task. In this sense, learning style can be supported in some circumstances and could be refuted in other instances depending on the learning, learning task and the learning context. By definition, Woolfolk (2004) described learning style as the individual's favourite way of learning and studying, such as using pictures instead of books, interacting with others rather than working alone, learning in formal versus unstructured circumstances and so on. Learning style is a comparatively

constant cognitive, emotional and physiological activity that shows the actions and response towards the learning environment (Imamipour & Esfandabad, 2011). According to Chick (2010), learning style is an individual's preferred way to engage, process, understand and hold information. Learning styles is widely used to describe how learners gather information, sift through the information, interpret the information, organize the information, come to conclusions about the information, and "store" information for use. Researchers assume that each student has the best and lasting methods to understand, organize, and store knowledge (Imamipour & Esfandabad, 2011). The learning style tries to clarify the difference in the approach of learning among students (Vaughn & Baker, 2008). Grasha (1996) labelled six main learning styles dependent on how learners interact with their instructors and peers. The styles are independent, dependent, collaborative, avoidant, participant, and competitive. Independent learners desire to think for themselves and are self-assured about their learning capabilities. They desire to work alone, learning content that they consider important. Dependent learners display little intellectual curiosity and study only what is required. They look up to authority figures, teachers, and peers for definite plans on what needs to be done. Collaborative learners enjoy working with peers and teachers with the hope of sharing ideas. Avoidant learners are uninterested and seem stunned by the learning situation. They are not excited and show no effort in the learning process. Participant learners are noble citizens. They are eager to do as much as is required to meet the requirements. They partake in most learning activities and are likely to engage actively in the learning process. Competitive learners always compete with their peers for grades and prefer to be the centre of attention and always want to receive recognition for their deeds (Grasha, 1996).

Learning style is defined by characteristics such as age, gender, cognitive styles, personality, intellectual capacity, sensorial nature, academia, temperament, culture, or creative thought (Nuzhat, Salem, Quadri, & Al-Hamdan, 2011). One of the topics addressed several times in literature is whether gender differences exist in the learning style. A number of studies have shown gender differences in learning style preferences among students. Baneshi, Tezerjani and Mokhtarpour (2014) reported that females have inclinations for Cooperative learning styles, than males who score higher on Independent learning styles. Hamidah, Sarina, and Jusoff (2009) and Amir, Jelas, and Rahman, (2011) stated that females had higher preferences than males for Cooperative and Competitive learning styles. On the contrary, O'Faithaigh (2000) found that males had higher preferences than females for Independent and Competitive learning styles. Again, a study by Azarkhordad, and Mehdinezhad, (2016) based on gender and learning styles revealed that male students' dominant style was cooperative while female students' dominant style was competitive style.

According to Reynolds (1997), Curry (1999) and Gudnason (2017), the variable learning styles has some issues with respect to internal and external validity, reliability and participants inability to distinquish between the learning approaches. The research organised by the above authors clearly indicates the non reliance on the variable and the use of the scales as an indicator of the learning styles of individuals. Despite the critique on the variable of learning styles, the authors still dem ot fit to include the variable in the study because the learning syles was developed based on our genetics, life experiences and the demands placed on us by the environments. These reasons informd the use of the learning style in the study.

The COVID 19 crisis has brought some rapid changes to the nature of education worldwide. A significant aspect of this change is the shift of learning from the traditional face to face classroom to the online education (Lei & Medwell, 2021). The effects have greatly affected the styles in which students learn. Learning in a global pandemic has caused a change in the learning styles of students. Students who used to learn through the collaborative and cooperative learning style have shifted to the individialised learning style (Yu & Yuizono, 2021). Some students who are used to the collaborative learning style had to find ways of learning collaboratively online. This in effect caused most universities to help their students get acquainted to online learning and in particular, maximise collaborative online learning (Lei & Medwell, 2021).

2.3. Sense of Belonging

A sense of belonging is used as a sense of university community in this study. A sense of belonging denotes students' feelings of being accepted, included by and connected to their institutions (Goodenow, 1993). Tinto (2012) defined sense of belonging as a comprehensive sense of membership that emanates from students' view of their participation in a variety of surroundings and the support they receive from those around them. The sense of belonging is characterised as the subjective sense of being a valued and legitimate member of a particular environment and being incorporated into it (Walton & Cohen, 2007; Good, Rattan, & Dweck, 2012). A sense of belonging is considered a central construct, which has the capacity of orienting interventions aimed at increasing the well-being of members (Fisher, Sonn, & Bishop, 2002). Ghanaian universities, like other universities globally have historically provided individual programmes and resources to create a sense of community and reinforce connections between students and the university. Such university programs are not limited to campus-wide gatherings, one-on-one consulting appointments, professional and mentoring seminars that help students develop a sense of belonging to the school, which in turn enhance their learning experiences and educational advancements (Pascarella, & Terenzini, 2005; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Duran, Dahl, Stipeck, & Mayhew, 2020). The University of Cape Coast provides services and programs such as counselling, students support services, open communication, mentoring services, etc. These services and programs increases the sense of belonging among the students in the university.

A number of research studies have described the difference that exists in the sense of belongingness with respect to gender. Experimental research into the situation assessing the sense of belonging of students indicates that females felt less belonging than men (Good, Rattan, & Dweck, 2012). According to Murphy, Steele, and Gross (2007), female students reported a lower sense of belonging. This was as a result of the typical asymmetric gender ratios in universities. Hughes, Im and Allee (2015) indicated that female students had a lower sense of belonging than males. This is because they are more likely to fail in an academic environment and are often influenced by their subjective experiences. Walton and Cohen (2007) indicated that female students fall short of sense of belonging more than their male counterparts. Margolis and Fisher (2002), Margolis et al. (2008), Barker et al. (2009) and Strayhorn (2012) supported this by alleging that it results from the assertion that socially stigmatized groups are uncertain about their membership of a community. In other studies, it was found that female students had greater sense of belonging as compared to male students, where this difference is explained by the varying socialization processes for male and female students (Sanchez, Colon, & Esparza, 2005; Newman, Newman, Griffen, O'Connor, & Spas, 2007). Research has shown that female students ascribe more importance to group membership, as well as relatedness and connectedness, while male students are more inclined towards competition and autonomy (Sanchez et al., 2005). A sense of belonging is of great value for students. In one study, Murphy, Boucher, onend Logel (2021) found increased levels of belonging among students. The study further revealed that students who felt a strong sense of belonging were highly engaged and likely to join school organisations and make connections with peers, faculty, and staff. Not only that, students who feel like they belong in school earn higher grades and choose to succeed in more difficult courses. Belonging can be difficult to foster during the COVID-19 pandemic, with the need for social distancing and remote learning. Indeed, it takes more attentive and new strategies to support students' sense of belonging given these pandemic challenges (Murphy, Boucher, & Logel, 2021).

In the midst of natural occurrences, numerous remedies are often employed to leverage the situation. Indifferently, such remedies are equally adopted by educational stakeholders and consumers of the general educational process. As a result of COVID 19, several universities closed their campuses suddenly, prohibiting students and non-students from hosting any social activity that could bring people together (teaching of academic courses, sports and student-centred forums). In this period, the institutional focus was on moving teaching and learning to virtual and distance learning (The Chronicle of Higher Education, 2020). Efforts towards recreating out-of-class interactions and helping students in a virtual world is

important, but many educational institutions in the African continent seem to lack knowledge in practicing such an important alternative teaching and learning procedure. As a result, many students felt disconnected from their institutions, their peers and expressed the need for more contact and support, in particular from funding and academic consultants (Blankstein, Frederick, & Wolff-Eisenberg, 2020). In the case of the University of Cape Coast in Ghana, many students felt disconnected geographically, some also expressed problems of internet connectivity in their locations, while others lacked consistent electricity for any meaningful virtual learning, hence the call for stakeholder engagement between university management and students' leadership. Out of broad consultations among stakeholders, it was concluded that all online or virtual academic activities should be stopped but to be substituted with batch-to-batch on-campus teaching and learning procedures. Having COVID-19 present and glaring, there was the need for students who are called back to campus to observe and respect all preventive protocols. In this, students are obliged to observe social distancing, frequent hand washing, and incessant application of certified hand sanitizers. Coupled with this, students are to make personal decisions such as personalised learning (choosing a learning style) and peer group interactions (peer attachment) while having in mind their sense of being part of the bigger university community.

The study sought to determine the extent to which students become attached to themselves in the midst of the COVID-19 pandemic, their sense of being part of their university community in the midst of the COVID-19 pandemic, how their peer attachment could predict learning styles of students in the midst of COVID-19 pandemic, and how the students' sense of belonging moderate the influence of peer attachment on learning styles amidst COVID-19 pandemic and to determine gender differences in peer attachment, learning styles and sense of belonging among students.

3. Research Design

The design considered for this study was analytical cross-sectional survey design. This design was chosen over others because data was collected at one point in time from different groups within the target group. The analytical cross-sectional survey design allows associations and predictions among variables under investigation. Analytical cross-sectional studies aim to assess associations between different parameters such as attitudes and opinions of people concerning a situation or phenomenon (Kesmodel, 2018). Advantageously, analytical cross-sectional research may be conducted without the need for follow-up, making them easier to perform. However, the key drawback of analytical cross-sectional studies is that the sequential relation between variables cannot be determined since both are studied at the same time (Di Girolamo & Mans, 2019).

3.1. The Study Group

The population of the study was 4,758 (male students=2,612; female students=2,146). These students were final year regular undergraduates (level 400) who were called back to campus to complete the 2019/2020 academic calendar purposely for certification and graduation during the COVID-19 pandemic. These students cut across the four (4) colleges that run regular undergraduate programmes. These colleges were the College of Education Studies (N=2,149; n=128), College of Humanities and Legal Studies (N=1,251; n=75), College of Agriculture and Natural Sciences (N=823; n=49) and College of Health and Allied Sciences (N=535; n=32). The sample size for the study was two hundred and eighty-four (284) students. The sample size was derived based on Nwana (1992) suggestion of five percent of the target population as a required sample proportion for quantitative studies. The sampling procedures for the study were the stratified-proportionate and convenient sampling techniques. These sampling procedures were applied to all four (4) colleges that run regular undergraduate programmes, University of Cape Coast, based on their contributions to the target population. This technique ensured that individuals from all the subgroups in the population were given an equal chance to be selected and increases researchers' statistical precision. The students were divided into their various colleges which serves as the strata. It was from these strata that the respondents were selected for the study. Due to the observation of the COVID-19 protocols, the convenient

sampling procedure was appropriate for selecting the various respondents. This was done by visiting the selected lecture theatres assigned to each of the colleges in the university purposely to prevent the escalation of COVID-19 pandemic among students.

3.2. Data Collection Tools

The data for the study was gathered using adapted versions of Learning Preference Scale (32-items; α=.81) developed by Owens and Straton (1980) [Competitive=10-items, Coopertative=10-items and Individual=12-items. The instrument was on a 4-point Likert scale with numerical values of 4-3-2-1 basis, with 4 representing the strongly agree and 1 representing strongly disagree. Again, Adolescent Friendship Attachment Scale [AFAS] (30-items; α=.87) developed by Wilkinson (2008) [Secure Attachement=15-items, Anxious Attachment=6-items and Avoidant Attachment=9-items] was used. It was on a scale of ‘‘strongly disagree’’ (1) to ‘‘strongly agree’’ (5). Lastly, Psychological Sense of School Membership (18-items; α=.86) developed by Goodenow (1993) with a scale of Not at all true (1) to Completely true (5) was used. These scales were modified to suit the context of this study by changing some words and phrases to meet the understanding of the respondents. After this process, the scales were piloted on 40 responsdents from the Cape Coast Technical University, where the internal consistencies in terms of Cronbach Alpha were established each scale (Learning Preference Scale=.92; AFAS=.87; Psychological Sense of School Membership=.86). The scales were equally subjected to face, content, convergent and discriminant validities as it was necessary for the right information to be carried on each scale. The face and content validities of all the scales were ensured by experts in the field of scale development in the University of Cape Coast. In terms of convergent and discriminat validities, attachment scale produced correlation coefficients between .30 to .70 using Pearson Product-Moment Correlation and a compound reliability coefficient of .92, learning style scale produced correlation coefficicents between .40 to .60 using Pearson Product-Moment Correlation and a compound reliability coefficient of .87 and sense of belonging scale produced correlation coefficients between .30 to .60 using Pearson Product-Moment Correlation and a compound reliability coefficient of .86. These figures produced by the scales met the thresholds proposed for convergent and discriminat validity (Hair et al., 2017; Yu, 2012).

3.3. Data Analysis

The data gathered with the adapted scales from the students was analysed using descriptive (Frequencies and Percentages) and inferential statistics (Multivariate Multiple Regression, Simple Moderation with Hayes Process Macro and Multivariate Analysis of Variance).

3.4. Findings and Discussions

Research Question One: What is the level of students’ peer attachment during COVID-19 pandemic?

The question sought to to find the extent to which students become attached to themselves in the midst of the COVID-19 pandemic. It is assumed that the global pandemic may ruin the levels of attachment among students after being educated on social distancing when they returned to wrap up the academic year. Table 1 presents the results:

Table 1.

Level of Peer Attachment

Levels	Frequency	Percent
Low Peer Attachment	193	68.0
Moderate Peer Attachment	91	32.0
High Peer Attachment	0	0.0
Total	**284**	**100.0**

Field Data

Table 1 shows results of the levels of peer attachment among students. The study found that majority of the students experienced low level of peer attachment (n=193; 68.0%) while no student experienced a high level of peer attachment (n=0; 0.05). This implied that the the majority of the students cherished being on their own within the COVID-19 pandemic than associating or getting to be in the company of others. It further buttressed the point that social distancing was important. Despite the significant role social distancing could play in preventing the escalation of the COVID 19 pandemic, it has the chance to also re-orient student-to-student friendship from group-based to individual-based. With this, it could cause disunity among students and brew poor relationship among them. The findings imply that students might be disunited in the midst of future natural occurrences. The finding defeats the idea espoused by Theisen et al. (2018) that healthy peer relationship among students is centered on mutual understanding, trust and good quality of communication but corroborated the assertion of Roelofs et al. (2013) assertion that poor relationship brings about fear of rejection of a need for closeness and affiliation, poor communication and loss of trust among students. Furthermore, the study findings debunked those of Mepham and Stadtfeld (2020) and Banks, and Weems (2014), of found high levels of peer attachment, which reduced negative experiences of young people during a pandemic.

Research Question Two: What is the level of students' sense of belonging during COVID-19 pandemic?

The question sought to to find the extent to which students felt they are part of their university community in the midst of the COVID-19 pandemic. It is assumed that the global pandemic may ruin the levels of belonging among students after being educated on social distancing when they returned to finish the academic year. Table 2 presents the results:

Table 2.

Level of Sense of Belonging

Levels	Score Range	Percent
Low Sense of Belonging	97	34.2
Moderate Sense of Belonging	93	32.7
High Sense of Belonging	94	33.1
Total	**284**	**100.0**

Source: Field Data

Table 2 shows results of the level of sense of belonging among students. The study found that majority of the students had a low level sense of belonging (n=97; 34.2%) to the university community due to the distractions caused by the COVID 19 pandemic, followed by those with a high sense of belonging (n=94; 33.1%) and those with a moderate sense of belonging (n=93; 32.7%). It is clear in the revelation that quite a good number of students felt being part of the university despite the disruptions encountered as a result of COVID-19. The finding seems not to be surprising as students may reason that their stay at home could gurantee their expulsion from their university but it was an informed strategy to prevent and preserve their lives from contracting the deadly virus. As they continued to stay home, they could lose the trust for the educational system because nothing was pointing to the fact they may resume to academic work immediately. This low level sense of belonging among students could translate into getting low grades as they might not understand the difficult nature of studying at home. In fact, it is echoed by Murphy, et al (2021) that students who feel like they belong in school earn higher grades and choose to succeed in more difficult courses but same cannot be said about others who may not during pandemics. Such a low level sense of belonging occurs because of social distancing and remote learning, hence it requires extra commitment from students, which may seem difficult for them during the COVID-19 pandemic.

Hypothesis 1: Peer attachment among students predicts their learning styles

The hypothesis sought to test the extent to which peer attachment could predict the learning styles of students in the midst of COVID-19 pandemic. The multivariate multiple regression (MMR) was used because peer attachment being the predictor was multidimensional with sections such as secure attachment, anxious attachment and avoidant attachment while the criterion being learning styles was multidimensional with subscales such as individual learning style, cooperative learning style and competitive learning style. Before performing the test, normality tests, linearity, homoscedasticity and multicollinearity assumptions were certified. Because the test involved multiple dependent variables, it was necessary to set a higher alpha level so that the chance of committing Type error (rejecting the null hypothesis where indeed, there are no significant results) could be reduced. In doing this, the Bonferroni adjustment proposed by Tabachnick and Fidell (2013) was applied, where the researchers divided the number of dependent variables with the original alpha level thus, .05/3=0.017, which served as the new alpha level. Literature indicates that Bonferroni adjusted alpha helps minimizes the original alpha level from .05 so that the probability of committing Type I error can be curtailed (Todorov & Filzmoser, 2010). Table 3 presents the results:

Table 3.

Multivariate Multiple Regression (MMR) Results for Peer Attachment and Learning Styles

L. Styles	Parameter	B	S. E	T	Sig.	P E S	F	p
Individual	Intercept	14.375	2.244	6.406	.000	.128	5.226	.000
	Secure	.330	.088	3.757	.000	.048	5.226	.000
	Anxious	.168	.109	1.535	.126	.008	5.226	.000
	Avoidant	.089	.087	1.017	.310	.004	5.226	.006
Cooperative	Intercept	13.877	2.752	5.042	.000	.083	5.751	.000
	Secure	.321	.108	2.982	.003	.031	5.751	.000
	Anxious	.514	.134	3.833	.000	.050	5.751	.000
	Avoidant	-.137	.107	-1.283	.201	.006	5.751	.000
Competitive	Intercept	6.970	2.422	2.878	.004	.029	11.767	.000
	Secure	.157	.095	1.661	.098	.010	11.767	.000
	Anxious	.268	.118	2.271	.024	.018	11.767	.000
	Avoidant	.489	.094	5.196	.000	.088	11.767	.000

a. R Squared = .203 (Adjusted R Squared = .195)

b. R Squared = .260 (Adjusted R Squared = .252)

c. R Squared = .242 (Adjusted R Squared = .243)

Source: Field Data

Table 3 shows the results of the test of multivariate multiple regression (MMR), where secure attachment, anxious attachment and avoidant attachment served as predictors to the criteria in terms of individual learning style, cooperative learning style and competitive learning style. Using the Wilk's Lambda to test for the omnibus hypothesis, it showed that all beta values across the dependent variables equalled to zero, and was statistically significant, thus F (3, 278) =15.17, W=.859, $p < .017$. With individual learning as the criterion, R2 =.203, F=.5.226, $p < .017$. This shows that 20.3% of secure, anxious and avoidant attachments explained the variance in individual learning styles of students. With cooperative learning style as the criterion, R2 =.260, F=5.751, $p < .017$. This shows that 26.0% of secure, anxious and avoidant attachements explained the variance in cooperative learning styles of students. With competitive learning style as the criterion, R2 =.242, F=11.767, $p < .017$. This shows that 24.2% of secure, anxious and avoidant attachements explained the variance in competitive learning styles of students. With individual predictions using individual learning style as a criterion, only secure attachment (Beta=.330; t=3.757; p<.000; η2p=.048) predict individual learning style of students with a small effect size while anxious attachment (Beta=.168; t=1.535; p>.126; η2p =.008) and avoidant attachment (Beta=.089; p>.310; η2p =.004) did not predict individual learning style of students. This implies that students were aware of the fact that their

colleagues could make them contract COVID-19, hence their choice of individual learning styles in school. In such situations, they strictly go by the protocols established to prevent the spread of the pandemic. Again, using cooperative learning style as a criterion, secure attachment (Beta=.321; t=2.982; p<.003; ηp=.031) and anxious attachment (Beta=.514; t=3.833; p<.000; ηp=.050) predict with small effect sizes, where anxious attachment predict higher than secure attachment but avoidant attachment did not predict cooperative learning styles of students (Beta=-.137; t=-1.283; p>.201; ηp =.006). This implies that upon all COVID-19 restrictions imposed on students, they still have some trust among themselves and might cooperate in some learning situations and see themselves as indifferent in those situations. Furthermore, using competitive learning style as a criterion, anxious attachment (Beta=.368; t=2.271; p<.024; ηp=.018) and avoidant attachment (Beta=.489; t=5.196; p<.000; ηp=.088) predict with small effect sizes respectively, where avoidant attachment predict higher than anxious attachment but secure attachment did not predict competitive learning styles of students (Beta=.157; t=1.661; p>.098; ηp =.010). This implies that students do communicate with their colleagues in the COVID-19 pandemic but see them to be different in a way, hence competing with them in learning situations. This is possible as one student might not know what a colleague is doing because there are restrictions in grouping, hence studying in a competitive mood.

Hypothesis 2: Students' sense of belonging moderating their peer attachment learning styles

The hypothesis sought to test the extent to which students' sense of belonging moderating their peer attachment learning styles amidst COVID-19 pandemic using Andrew Hayes Process model 1 (simple moderation). In this, a sense of belonging is anticipated to either act as an enhancer, buffer or antagonist. Although the scales used in this test were multidimentional, the focus was not dimensional moderation analysis but composite construct moderation test because no single dimension of the constructs used could be used to describe the composite contribution. Again, mediation test was sacrified for moderation test because the levels established on the moderator were not used as basis for performing the test. The running of moderation was based on random bootstrap samples of 5,000. Table 4 presents the results:

Table 4.

Students' Sense of Belonging Moderating Peer Attachment and Learning Styles

Variables	Coeff	Boot SE	Boot LLCI	Boot ULCI	t-value	P
Constant	96.544	1.160	94.260	98.828	83.204	.000
Peer Attachment	.584	.075	.436	.732	7.759	.000
Learning Styles	.669	.132	.410	.929	5.082	.000
Interaction	-.003	.006	-.015	.008	-.548	.584

Model summary: R^2=.385; F (3, 280) =58.534, p=.000
Interaction: R^2 *change*=.0007; F (1, 280) =.3004, p=.5841
Predictor: Peer Attachment
Criterion: Learning Styles
Moderator: Sense of Belonging

The result in Table 4 shows that in the period of COVID-19, students' sense of belonging to the university community did not moderate their peer attachment on learning styles, b=-.003, t=-.548, CI (-.015, .008). Figure 1 indicates the graphical representation of the moderation result:

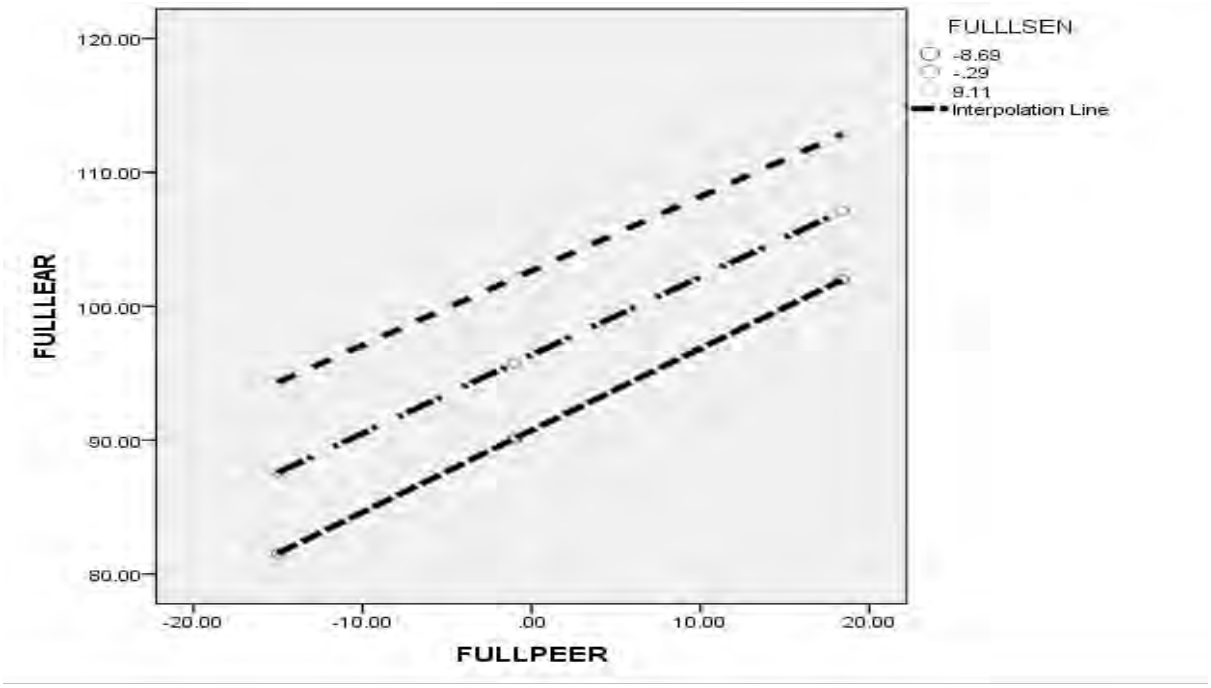

Fig 1. Graphical Representation of the Moderation Result

Figure 1 indicated that no significant moderation effects were evident for a sense of belonging in peer attachment and learning styles. It can be deduced that the graph is linear, indicating no moderation effect. With this, sense of belonging did not enhance, neither did it serve as a buffer or an antagonist to peer attachment as it predicts learning styles among students during the period of COVID-19.

Hypothesis 3: Gender Differences exist in Peer Attachment (secure, anxious and avoidant), Learning Styles ((individual, cooperative and competitive) and Sense of Belonging (belonging, accepting and rejection)

The hypothesis sought to determine gender differences in peer attachment (secure, anxious and avoidant attachments), learning styles (individual, cooperative and competitive) and sense of belonging (belonging, accepting and rejection). Relying on the variable combination, MANOVA was deemed appropriate for the analysis because the dependent variables were measured in nine levels against male and female (gender). Before running the MANOVA test, homogeneity of variance-covariance assumptions was met using the Box's M Sig. value of .136, which was greater than .05. Again, Levene's Test was checked for violations of equality of variance for all nine dependent variables. The results showed that none of the variables violated the equality of variance assumptions as secure attachment (.580), anxious attachment (.372), avoidant attachment (.851), individual learning style (.051), cooperative learning style (.901), competitive learning style (.770), belonging sense of belonging (.652), accepting sense of of belonging (.730), and rejection sense of belonging (.940), which was all produced sig. values greater than .05. Table 5 presents the results on the descriptive statistics:

Table 5.

Descriptive Statistics

Variables	Gender	Mean	Std. D	N
Individual Learning Style	Male	32.43	8.97	136
	Female	30.94	7.75	148
	Total	31.65	8.37	284
Cooperative Learning Style	Male	35.12	10.85	136
	Female	35.84	10.49	148

	Total	35.49	10.65	284
Competitive Learning Style	Male	29.44	9.43	136
	Female	28.86	9.13	148
	Total	29.14	9.26	284
Sense of Belonging	Male	15.63	3.65	136
	Female	14.75	3.60	148
	Total	15.17	3.65	284
Acceptance Sense of Belonging	Male	16.04	3.50	136
	Female	15.16	3.63	148
	Total	15.58	3.59	284
Rejection Sense of Belonging	Male	16.80	3.74	136
	Female	16.28	3.71	148
	Total	16.53	3.72	284
Secure Attachment	Male	34.00	7.90	136
	Female	33.11	8.21	148
	Total	33.54	8.06	284
Anxious Attachment	Male	27.13	6.80	136
	Female	25.82	6.38	148
	Total	26.45	6.60	284
Avoidant Attachment	Male	20.74	5.45	136
	Female	19.37	5.43	148
	Total	20.03	5.48	284

Source: Field Data

Table 5 shows that descriptive results of the study variables indicated that there were no significant differences in mean scores of male and female students during the COVID-19 pandemic in terms of individual learning style (male: M=32.43, SD=8.97; female: M=30.94, SD=7.75), cooperative learning style (male: M=35.12, SD=10.85; female: M=35.84, SD=10.49), competitive learning style (male: M=29.44, SD=9.43; female: M=28.86, SD=9.13), belonging sense of university community (male: M=15.63, SD=3.65; female: M=14.75, SD=3.60), acceptance sense of university community (male: M=16.04, SD=3.50; female: M=15.16, SD=3.63), rejection sense of university community (male: M=16.80, SD=3.74; female: M=16.28, SD=3.71), secure attachment (male: M=34.00, SD=7.90; female: M=33.11, SD=8321), anxious attachment (male: M=27.13, SD=6.80; female: M=25.82, SD=6.38) and avoidant attachment (male: M=20.74, SD=5.45; female: M=19.37, SD=5.43) at .05 level of significance. It implied that, descriptively, male students were not different from female students in their peer attachment, learning styles and sense of belonging as most schools are fraught with problems of COVID-19 pandemic. However, the descriptive results were not enough to confirm the non-significant differences in mean scores of the respondents, hence the need to examine the MANOVA Multivariate Tests in Table 6:

Table 6.

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.973	1088.508	9.000	274.000	.000	.973
	Wilkes Lambda	.027	1088.508	9.000	274.000	.000	.973
	Hotelling's Trace	35.754	1088.508	9.000	274.000	.000	.973

	Roy's Largest Root	35.754	1088.508	9.000	274.000	.000	.973
Gender	Pillai's Trace	.052	1.664	9.000	274.000	.097	.052
	Wilks Lambda	.948	1.664	9.000	274.000	.097	.052
	Hotelling's Trace	.055	1.664	9.000	274.000	.097	.052
	Roy's Largest Root	.055	1.664	9.000	274.000	.097	.052

Source: Field Data

Table 6 presents the results of the multivariate test (MAVOVA) which checked for statistical differences between male and female students in terms of peer attachment, learning styles and sense of belonging. Table 6 showed that no differences existed between male and female students as the Wilks' Lambda results showed a statistically insignificant differences in gender, F (9, 274) =1.664, p>.097; Wilks' Lambda=.948, partial eta squared =.052. Based on the non-significant differences detected, there was no need for further examination of the test. Deductively, it was revealed that male students did not significantly differ from female students in peer attachment, learning styles and sense of belonging amidst the COVID-19 global pandemic. The findings disconfirmed several studies that found differences between male and female students in peer attachment, learning styles and sense of belonging. For instance, Gorrese and Ruggieri (2012) and Ma and Huebner (2008) in their studies found female students attaching to their peers more than their male counterparts but such was not the case in the current study. Also, Henrich et al. (2001), Nelis and Rae (2009), and Richards et al. (2010) found female students are more attached to their peers than their male counterparts because they display higher trust in their friends and a deep communication with them (Gullone & Robinson, 2005; Ruijten et al., 2011; Song et al., 2009). In terms of learning styles, Baneshi et al. (2014) found female students cooperative learning styles than their male counterparts who fronted for independent learning styles. This was in line with Amir et al. (2011) and Hamidah, Sarina, and Jusoff (2009) female students' preference for cooperative learning styles over competitive learning styles against their male counterparts. Inversely, Azarkhordad, and Mehdinezhad (2016) male students' dominant style was cooperative, while female students' dominant style was competitive style, where such behaviours were not evident in the current study. In terms of sense of belonging, Good et al. (2012) found female students to feel less belonging than their male counterparts and Murphy et al. (2007) also found female students reporting a low sense of belonging. Furthermore, Hughes et al. (2015) found a lower sense of belonging among female students than their male counterparts.

4. Conclusion and Suggestions

It is evident from the results that the presence of COVID-19 has distracted students to the extent that most of them has low peer attachement and exhibited low belongingness. The results again demonstrated that most of them exhibit individuality in their academic work. It is equally important to note that the experience of low peer attachment predicted students learning styles. Again, some students indicated that the effects of the pandemic made them develop the cooperative style of learning. Other students who had the opportunity to collaborate with their colleagues exhibited some competitiveness in their learning.

With the warning of a third wave, there is no doubt that the COVID-19 pandemic will take a longer time to be defeated by local and global health professionals stakeholders. As such, it is important that students continue to practice individual learning styles most often but could collaborate with some few colleagues in some other academic situations so that they could maintain their bond. In this process, universities and schools in general should be mindful of the fact that students could contract the virus irrespective of their current practices of academic engagement. Furthermore, as students keep isolating themselves from colleagues, it is important that they feel being part of their mother institutions as the fight to eradicate COVID-19 continued unabated. It is advised that school psychologists and counsellors should constantly

be in touch with students as they keep observing protocols of COVID-19 so that they may not lose their attachment abilities and sense of belonging.

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